

NON-PUBLIC?: N  
ACCESSION #: 9205130045  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Davis-Besse Unit No. 1 PAGE: 1 OF 05

DOCKET NUMBER: 05000346

TITLE: Reactor Trip from 40 Percent Power Due to Main Turbine Trip  
EVENT DATE: 03/01/92 LER #: 92-002-01 REPORT DATE: 05/08/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 040

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Andrew V. Antrassian, Associate TELEPHONE: (419) 321-7908  
Engineer - Nuclear Licensing

COMPONENT FAILURE DESCRIPTION:  
CAUSE: E SYSTEM: SB COMPONENT: PCV MANUFACTURER: F130  
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On March 1, 1992, at 1500 hours, the plant experienced a reactor trip from approximately 40 percent power. The reactor trip was initiated by an I&C technician troubleshooting the rewiring of the main turbine vacuum trip system. While checking the condition of the main turbine vacuum pressure switches, the technician incorrectly placed a short across the high exhaust hood temperature trip contact. This resulted in an Anticipatory Reactor Trip System trip of the reactor.

Failure of the position feedback arm on Turbine Bypass Valve (TBV) SP13B2 resulted in the valve failing open causing a slight post-trip overcooling of the Reactor Coolant System (RCS). Operator initiated actuation of the Steam and Feedwater Rupture Control System at 1503 hours terminated the RCS overcooling.

I&C Maintenance personnel will review this LER and receive training by

June 26, 1992. Maintenance corrective actions associated with the main turbine vacuum trip circuitry were completed prior to plant startup. Repairs to the failed TBV were completed on March 2, 1992. The four remaining TBVs of the style that failed are scheduled for replacement during 8RFO. Corrective actions related to work control issues include procedure changes, required reading, and training of appropriate personnel.

END OF ABSTRACT

TEXT PAGE 2 OF 5

Description of Occurrence:

On March 1, 1992, at 1500 hours, the unit experienced an Anticipatory Reactor Trip System (ARTS) initiated reactor trip from approximately 40 percent power. The unit had been increasing power from approximately 6 percent after the completion of planned maintenance activities in the containment which were unrelated to the reactor trip.

Maintenance-I&C personnel were troubleshooting the rewiring of the main turbine vacuum trip system under Maintenance Work Order (MWO) 7-91-0395-01 by checking the condition of the vacuum pressure switches in junction box JT 5306. The I&C personnel were unaware that part of the rewiring under the MWO had introduced a redundant power source to the circuit they were checking and that the circuit was actually energized. The redundant power source had been added by the installation of a jumper between terminals 1 and 5 on terminal block EHC-B. Believing the circuit to be de-energized, the I&C technician performing the pressure switch check used a multimeter set in the ohms mode. The I&C technician incorrectly placed the leads of the multimeter across terminals 2 and 5 which effectively bridged an open contact resulting in actuation of the high exhaust hood temperature trip circuitry which triggered a main turbine trip. Because indicated reactor power was greater than the ARTS arming setpoint, the turbine trip resulted in an ARTS initiated reactor trip.

Unit response to the reactor trip was as designed with the exception of a slight Reactor Coolant System (RCS-AB) overcooling which resulted from Turbine Bypass Valve (TBV-PCV) SP13B2 failing open rather than throttling back to regulate Steam Generator outlet pressure. TBV SP13B2 failed open due to damage sustained to its position feedback arm.

Initial notification of the reactor trip was made on March 1, 1992, at 1736 hours, in accordance with 10CFR50.72(b)(2)(ii). This LER is being submitted in accordance with 10CFR50.73(a)(2)(iv).

Plant startup commenced on March 2, 1992, at 1450 hours, and the unit was returned to full power operation on March 3, 1992, at 0625 hours.

Apparent Cause of Occurrence:

Engineering has determined that the most probable cause of the failure of the position feedback arm on TBV SP13B2 is attribute to reaction forces resulting from moisture within the valve flashing to steam and/or degraded instrument air at the valve when it was challenged during the transient. This caused the valve to travel against the normal positioning mechanism which resulted in the position feedback arm failure.

TEXT PAGE 3 OF 5

Apparent Cause of Occurrence (Continued):

The primary cause of the reactor trip is attributed to personnel error. During troubleshooting of the rewiring of the main turbine vacuum trip system, an I&C technician incorrectly placed leads of a multimeter across the wrong two terminals. This action resulted in the actuation of the high exhaust hood temperature trip circuitry and a subsequent reactor trip.

Contributing to the cause of the reactor trip are several work control issues as they relate to the work performed under MWO 7-91-0395-01. The MWO was created to address concerns documented in Potential Condition Adverse to Quality Report (PCAQR) 91-0395. The PCAQR documents that the redundant turbine low vacuum trip pressure switches were not wired into the trip circuitry, and that the as-built wiring in the field did not correspond to the electrical connection drawings. MWO 7-91-0395-01 was to correct these wiring inconsistencies.

Several aspects of MWO 7-91-0395-01 reflect inadequate pre-job planning and evaluation. The MWO had been scheduled such that it could be performed during Mode 1 operation with the turbine on-line. During discussions between Maintenance and Engineering it was decided by Maintenance that the work should be performed with the turbine off-line, but the MWO did not reflect this decision. Additionally, the verification of computer alarms associated with the pressure switches could not be performed with leads lifted as specified in the MWO. The rewiring of the pressure switches resulted in the addition of a redundant power source to the turbine vacuum trip circuitry, which was unknown to the I&C Maintenance personnel performing the work.

Work practices during preparation for and performance of MWO 7-91-0395-01 were inadequate. Changes to the MWO description of work did not adequately describe the work to be performed. Changes were made in order to accomplish the work scope and the MWO was not changed. When unexpected conditions were encountered, continuity checks in the field began without properly notifying Operations and without adequately developing an action plan taking into account the changed status of the plant. Documentation in the MWO of the work performed was incomplete.

In addition, the decision to continue work under the MWO with the turbine on-line was made without adequate consideration of alternatives and consequences. When planned maintenance activities were completed in containment, the work on the main turbine vacuum trip system was still in progress. Operations management decided to place the turbine on-line, increase power to a steady-state level below the ARTS arming setpoint, and assign two operators the responsibility of tripping the turbine manually in the event of a

TEXT PAGE 4 OF 5

Apparent Cause of Occurrence (Continued):

loss of main turbine vacuum. The schedule called for completion of turbine vacuum trip work prior to placing the turbine on-line. Deviation from the work schedule occurred without a thorough review by Davis-Besse management.

Compliance to station procedures was not maintained. Contrary to DB-PN-00007, Control of Work, the MWO was not re-routed to the Shift Supervisor/Shift Manager for review of changes made to the MWO after granting permission to commence work. Contrary to DB-MN-00001, Conduct of Maintenance, and DB-MI-05013, Plant Miscellaneous Pressure Switch Calibration, wires were disconnected and jumpers installed without completing the jumper and lifted wire log or contacting the Shift Supervisor.

Analysis of Occurrence:

ARTS functioned properly to open the Control Rod Drive (AA) Breakers when the main turbine tripped. The Reactor Protection System (RPS-JC) trip circuitry functioned properly in response to low RCS pressure following the ARTS trip of the reactor. The Steam and Feedwater Rupture Control System (SFRCS-JB) functioned properly in response to operator actuation. The Auxiliary Feedwater System (BA) functioned properly upon initiation by the SFRCS. The Safety Features Actuation System (SFAS-JE) was not

challenged during this event.

As a result of TBV SP13B2 failing open, a slight overcooling of the RCS occurred. The duration of the overcooling was approximately 3 minutes and was terminated by operator initiation of the SFRCS.

The transient is categorized as a B2 transient using B&WOG Transient Classification Criteria.

No safety concerns were identified during the review of this reactor trip.

Corrective Action:

Repairs to TBV SP13B2 (Fisher Valve Model 476D-5-1-EP, Bailey Positioner Model 5324090-2) were completed on March 2, 1992. Due to their past performance, Toledo Edison intends to replace the four remaining Fisher TBVs. This replacement is currently scheduled for the Eighth Refueling Outage (8RFO).

Prior to plant startup, maintenance corrective actions associated with the main turbine vacuum trip circuitry were completed.

With regard to the personnel error, this event and the surrounding circumstances will be reviewed by Maintenance personnel during the Continuous Training Program. In addition, training will be performed on the proper use of test equipment. These actions will be completed by June 26, 1992.

TEXT PAGE 5 OF 5

Corrective Action (Continued):

Corrective actions for the work control issues described in the Apparent Cause of Occurrence section are described below.

Required reading of this LER will be performed by appropriate Operations, Maintenance, and Planning personnel by June 26, 1992.

DB-MN-00001 will be changed to require the Jumper and Lifted Wire Log to be completed concurrent with the actual work activity. This change will be completed by July 1, 1992. In addition, on April 29, 1992, a memorandum was issued by the Manager - Plant Maintenance to I&C and Electrical Maintenance personnel discussing the proper use of the Jumper and Lifted Wire Log, as well as proper Shift Supervisor notification.

Changes to the requirements for pre-evolution briefings are being processed as part of the corrective actions for LER 91-008-01. The pre-evolution briefings will include the Operating Crew, the Craft Supervisor, Craft Personnel, and Engineering support as appropriate. The briefing should identify the individual responsible for performing the evolution, the purpose and objective of the evolution, and the equipment or systems involved. In addition, the briefing will review the responsibilities of all personnel involved and the expected system responses and clearly specify parameter values at which action will be taken to stop the evolution or mitigate possible failures. These changes will be completed by May 29, 1992.

In addition, a step will be added to DB-OP-06901, Plant Startup, which requires the Duty Plant Manager, Operations Manager, and Maintenance Manager to review plant status prior to raising reactor power to 15%. During this review, attention will be focused on safety systems and equipment protective features that may be in off-normal conditions. This change will be completed by June 1, 1992.

Failure Data:

Previous reports involving ARTS reactor trips initiated by a turbine trip are LER 89-005 and LER 87-010. However, the events which caused these trips are unrelated to the events reported in this LER. Previous reports involving post-trip TBV failures are LER 88-028, LER 87-011, and LER 85-013.

NP 33-92-002 PCAQ No. 92-0084, 92-0134

ATTACHMENT 1 TO 9205130045 PAGE 1 OF 1

TOLEDO  
EDISON

A Centerior Energy Company

EDISON PLAZA  
300 MADISON AVENUE  
TOLEDO, OHIO 43652-0001

AB-92-025  
NP-33-92-002, Rev. 1

Docket No. 50-346

License No. NPF-3

May 8, 1992

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Gentlemen:

LER 92-002, Revision 1  
Davis-Besse Nuclear Power Station, Unit No. 1  
Date of Occurrence - March 1, 1992

Enclosed please find Revision 1 to Licensee Event Report 92-002. The changes are marked with a revision bar in the margin. Please destroy or mark superseded any previous copies of this LER.

Very truly yours,

Louis F. Storz  
Plant Manager  
Davis-Besse Nuclear Power Station

LFS/ed

Enclosure

cc: Mr. A. Bert Davis  
Regional Administrator  
USNRC Region III

Mr. William Levis  
DB-1 NRC Sr. Resident Inspector

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